## PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN THERMAL INSULATION MATERIAL

(71) We, MICROPORE INTERNATIONAL LIMITED, a British Company, of Hadzor Hall, Hadzor, Droitwich, Worcestershire WR9 7DJ, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to thermal insulation

10 material.

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A material of excellent thermal insulation properties can be made from a mixture of finely divided microporous silica aerogel, a reinforcing fibre such as alumina silicate and optionally a separate particulate opacifier. Such materials give excellent heat insulation when compacted under pressure and self bonded with or without the use of extra bonding agents to a density in the range 10 to 30 lb/ft<sup>3</sup> and are useful also as a base layer of thermal and electrical insulating material such as in heating units for smooth top electric cooker hobs as illustrated, for example, in our United Kingdom Patent No. 1 433 478.

When such a material is used at high temperatures it is found to sinter and consequently shrink. This is most undesirable since shrinkage leads to the formation of cracks and air gaps whose insulating properties are much inferior to the material itself. Materials such as described above have a limiting temperature at which they are useful of about 1000°C since above that temperature there is progressive sintering and shrinkage.

Until now it had been assumed that such temperatures were the highest temperature at which these materials could be useful. This view was based on the facts that, of the three components noted above, silica, even when it is used in a form which is as pure as possible, has the lowest temperature at which it starts to sinter and shrink significantly, and it is present in the mixture in by far the largest amount both by weight and by volume.

We have now found according to the invention that the highest temperature to which such insulating materials can be used in practice can be increased by incorporating alumina into these mixtures. Therefore according to the

present invention there is provided heat insulating material comprising an intimate mixture of microporous silica aerogel and ceramic reinforcing fibres, the mixture containing alumina in an amount of up to 12% by weight.

This heat insulating material of the invention is found to undergo less shrinkage when used at the same high temperatures as prior materials and in addition it can often be used at temperatures which are as much as 100°C high higher than existing materials while still suffering only an acceptable degree of shrinkage. Often therefore the materials of the invention can be used at temperatures as high as 1100 or even 1200°C without shrinkage due to sintering being too serious.

This is surprising when alumina fibres are used as the reinforcing fibres since the reinforcing fibres had been included merely to impart mechanical strength to the compacted material. Additionally, when fibres such as glass fibres or mineral wool fibres were tried in place of the alumina silicate high shrinkage occurred at relatively low temperature, e.g. around 700°C. Therefore the fibres previously used were chosen so as to be stable to at least the temperature at which significant sintering of silica occurs and to be readily available commercially. It is also somewhat surprising that the addition of alumina particles to the mixture gives this reduced shrinkage since the silica and other components can remain unchanged.

Microporous silica aerogel is a gel in which the liquid phase has been replaced by a gaseous phase in such a way as to avoid the shrinkage which would occur if the gel had been dried directly from a liquid. A substantially identical structure can however be obtained by controlled precipitation from a silica solution, the temperature and pH being controlled during precipitation to obtain an open lattice precipitate. The term "microporous silica aerogel" as used herein is deemed to include not only microporous silica aerogel as described above, but also equivalent microporous open lattice silica structures, such as fumed pyrogenic or electro-thermal types in which the average ultimate particle size is less than 100 millimicrometers. These materials can be made

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by the high temperature hydrolysis of a silicon tetrahalide such as silicon tetrachloride.

An example of a suitable microporous silica aerogel is the product which is com-5 mercially available from Degusa GmbH under the Trade Name Aerosil. Other suitable microporous silica aerogels are available under the name Cabosil from Cabot Corporation and Santosel from Monsanto.

The mixtures according to the invention 10 preferably additionally contain a separate opacifier intimately mixed with the aerogel. Thus in certain circumstances one of the other components may function as an opacifier,

15 e.g. carbon fibres. Examples of separate opacifiers are phase-stabilized black ferrosoferric oxide, titanium dioxide, chromium dioxide, rutile, zirconium dioxide, iron oxide, manganese dioxide, ilmenite or carbon black.

20 The amount of opacifier can be within the range of from 1 to 100% of the weight of the silica aerogel, is preferably from 2 to 100% of the weight of the silica aerogel, and is more preferably from 5 to 80% of the weight of the 25 silica aerogel.

As noted above the alumina can be present as an additional separate component, can be present as the, or part of the fibre, or can be present both as the, or part of the fibres and 30 as an additional separate component.

In cases where the or some of the alumina is present as the fibre, alumina fibres used should contain at least 90% and preferably at least 95%, by weight of alumina. Examples 35 of suitable alumina fibres are those which are sold under the Trade Mark Saffil by Imperial Chemical Industries Limited.

As noted above the reinforcing fibres usually constitute only a relatively small proportion of 40 the materials of the invention and within such limits, the greater the proportion of alumina fibres the less appears to be the shrinkage of the resulting material at high temperatures. However, the proportion of ceramic fibres to

45 be included is limited inter alia by a reduction of thermal insulating properties with increasing proportions of ceramic fibre and by problems of mechanical strength of the material particularly when moulded. It appears therefore that

50 about 12 and preferably about 10% by weight of alumina fibres is a practical upper limit while a more preferred proportion of alumina fibres to be added is in the range of from 1 to 7% by weight of the total material.

Not all the fibres within the materials of the invention need to be alumina fibres. Instead part of the presently used alumina silicate fibres or other fibres such as quartz fibres can be replaced by alumina fibres. The relative pro-60 portion of alumina fibres to total fibres is

preferably from 6 to 100% by weight. When the materials of the invention contain microporous silica aerogel, at least some alumina fibre and opacifier, the preferred and 65 most preferred percentages by weight of those

components are as follows:

	preferred	most preferred	
silica aerogel	50-97	60-73	
total fibre	1-10	2-7	
opacifier	2-40	25-40	70
Instead of using alumina fibres or in addition			
to alumina fibres, finely divided alumina as an			
additional component can be included. As with			
the fibres the alumina used should contain at			

least 90%, and preferably at least 95%, by weight of alumina. An example of a suitable alumina powder is that sold under the Trade Name Alox by Degussa GmbH.

When the materials of the invention contain

microporous silica aerogel, ceramic fibre which may or may not include alumina, opacifier and alumina as an additional component, the preferred and most preferred percentages by weight of those components are as follows:

	preferred	most preferred	85
silica aerogel	50-97	60-72	
fibre	0.5 - 10	2-7	
opacifier	2-40	25-40	
alumina	0.5-10	1-5	

The materials of the invention can be used in 90 the production of insulating materials and particularly panels as described in our United Kingdom Patent Nos. 1 350 661 and No. 1 247 674 to which reference is made for a full description as to the preparation of such panels 95 from the thermal insulating material.

Therefore according to one embodiment of the present invention there is provided insulation in the form of a porous envelope of fibrous material packed with material which is an intimate mixture of microporous silica aerogel, ceramic reinforcing fibres, and optionally an opacifier, the material containing alumina in an amount up to 12% by weight.

According to another embodiment of the 105 present invention there is provided a thermal insulating panel comprising an outer porous envelope containing a pressure consolidated block of thermal insulating material which is an intimate mixture of microporous silica 110 aerogel, ceramic reinforcing fibres, and optionally an opacifier, the material containing alumina in an amount of up to 12% by weight, the material of the envelope being in a state of tension and the block being bonded during 115 consolidation to the envelope partly by penetration of the particles of the insulating material on the outer surface of the block into the pores of the envelope having taken place under pressure. 120

Reference is also directed to those Patent Nos. 1 350 661 and 1 247 674 and to our United Kingdom Patent No. 1 247 673 for further details of the silica aerogel, and suitable opacifiers and fibres.

The thermal insulating material according to the invention can also be used as an electrical and thermal insulating material in electrical heating units. Examples of such units are heater units for smooth top cooker hobs

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particularly those where a coiled bare wire heating element rests on or is partially embedded in the insulating layer. The material of the invention is particularly useful as the supporting layer of thermal and electrical insulating material in the heating units described and claimed in our United Kingdom Patent No. 1 433 478 to which reference is made for a full description.

According to a preferred aspect of the present invention however we find that improved smooth top cooker hob heating elements can be prepared using the insulating materials of the invention without the presence 15 of an intermediate layer of bonded ceramic fibres as shown in our above noted United Kingdom Patent No. 1 433 478. This has the advantage that the heating element can be made somewhat smaller in overall depth 20 because of the elimination of this layer of

bonded ceramic fibres.

Therefore, according to a preferred aspect of the present invention there is provided an electrical heating unit for a smooth top cooker 25 hob comprising a supporting layer of thermal and electrical insulating material directly supporting an electrical heating element which is in the form of a helically coiled bare wire and which is secured to the insulating material by 30 metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting layer and which pass into but not entirely through the base layer, the material of the supporting layer comprising an intimate 35 mixture of microporous silica aerogel, ceramic reinforcing fibres, and optionally an opacifier, the mixture containing alumina in an amount up to 12% by weight.

As described in our United Kingdom Patent 40 No. 1 433 478 this base layer of thermal and electrical insulating material can be such that the heating element is held in position solely by virtue of the frictional grip of such material

upon the staples.

It is not essential that the surface of the supporting layer of insulating material be strictly planar and instead it can be given a slight spiral depression when being shaped so as to give assistance in the location of the 50 heating element.

A heating unit for a smooth top cooker hob according to the present invention will now be described by way of example with reference to the accompanying drawing

55 which shows a cross-section through the unit. The unit 10 shown in the drawing includes a dish-shaped base 12 of thermal and electrical insulating material. This material is of the type according to the invention containing micro-60 porous silica acrogel, an opacifier such as titanium dioxide and alumina fibres and/or particulate alumina.

As can be seen the base 12 has been moulded to a dish-shape having an annular 65 upstanding side wall 12a and a substantially

flat upper surface 14. Directly on this surface 14 rests a spirally arranged helically coiled bare wire heating element 16. To the ends of this element 16 are joined electrical supply leads 18 sheathed with electrical and thermal insulation. The convolutions of the heating element are secured in place by staples 24 which pass into but not completely through the base 12. They are held in position by the frictional grip between the staples and the material of the base 12.

The base 12 sits within an outer protective metal pan 20.

A thin ring 22 of a bonded composition of ceramic fibres rests on the upper edge of the side wall 12a. This ring 22 abuts the underside of a glass ceramic sheet (not shown) when the unit is in position in the cooker hob. As an alternative the base 12 may have a flat upper surface 14 with no annular side wall 12a or only a very small side wall, and a much thicker ring 22 of a bonded composition of ceramic fibres may be provided. The advantage of this is that the ring 22 has a much higher mechanical strength than the material of the base 12. As an alternative the ring 22 can be much thicker.

Because the material of the base 12 contains alumina fibres and/or particulate alumina it has a high resistance to shrinkage at the temperatures of the heating element which can therefore rest directly on the upper surface 14 of the base 12. Thus because there need be no additional disc of ceramic material between the surface 14 and the heating element, the overall depth of the unit 10 can be reduced as compared with the heating unit shown in the above noted United Kingdom Patent No. 1 433 478.

EXAMPLE 1 One thermal insulating material according to the invention for use as the base 12, consists of an intimate mixture of:

parts by weight	
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EXAMPLE 2 Another material according to the invention and containing particulate alumina consists o of an intimate mixture of:

	parts by weight	
microporous silica aerogel		120
(Aerosil)	60	
titanium dioxide	31	
alumina silicate fibres	7	
alumina (Alox)	2	
The words Aerosil and Cabosi	l are registered	125

Trade Marks.

WHAT WE CLAIM IS:-

1. Thermal insulation material comprising an intimate mixture of a microporous silica aerogel (as herein defined) and ceramic re-130

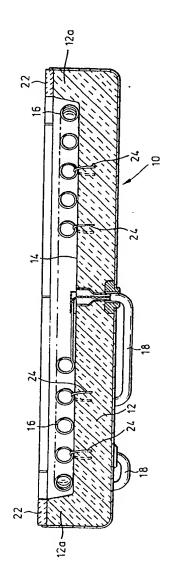
inforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  2. Material as claimed in Claim 1 which additionally includes an opacifier.  3. Thermal insulation material comprising an intimate mixture of microporous silica acrogel (as herein defined), an opacifier and alumina fibres in a proportion of up to 12% by weight.  10. 4. Material as claimed in Claim 2 or Claim 3 in which the opacifier is phase-stabilized black ferrosoferric oxide, iron oxide, manganese dioxide, (litanium dioxide, chromium dioxide, zirconium dioxide, ilemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of stilica.  6. Material as claimed in proportion of opacifier is from 2 to 100% of the weight of stilica.  7. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  12. Thermal insulating material substantially as herein described with reforence to either Example.  13. A heating unit for a smooth top cooker hob comprising a heating element and thermal insulation in the form of a supporting layer or beneath the element, the thermal insulation of the ported with reforence to either Example.  14. Insulation in the form of a supporting layer of fibrous material packed with material as claimed in any of claims 2 to 12. Its. A thermal insulating material as claimed in any of claims 3 to 12. Thermal insulating material as claimed in any of claims 3 to 12. The thermal insulation in the form of a supporting layer of brown material scalamed in any of claims 3 to 12. Its. A thermal insulating material scalamed in any of claims 3 to 12. Its. A thermal insulating material scalamed in any of claims 2 to 12. Its. A thermal insulating material scalamed in any of claims 3 to 12. Thermal insulating material scalamed in the element, the thermal insulating material scalamed in the propose of fibrous material scalamed in any of claims 1 to 12, the				
additionally includes an opacifier,  3. Thermal insulation material comprising an intimate mixture of microporous silica aerogel (as herein defined), an opacifier and alumina fibres in a proportion of up to 12% by weight.  1. 4. Material as claimed in Claim 2 or Claim 3 in which the opacifier is phase-stabilized black ferrosoferir coxide, iron oxide, manganese dioxide, /titanium dioxide, chromium dioxide, zironium dioxide, ilemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in form 5 in to 80% of the weight of silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains from 1 to 7% by weight of alumina fibres and in which the percentages by weight of the components are:  8. Material as claimed in Claim 8 in which the percentages by weight of the components are:  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  10. Material as claimed in Claim 8 in which the percentages by weight of the components are:  11. A heating unit for a smooth top cooker hob comprising a leating element, the thermal insulation being a material as claimed in the proportion of opacifier is from 5 to 80% of the weight of silica.  6. Material as claimed in any of claims 1 to 12. It material of the envelope being in a state of tension and the block being bended at least partly to the envelope by penetration of the particles of the insulating material of the envelope having taken place under pressure.  16. An electrical heating unit for a smooth top cooker hob comprising a neutrical packed with material of the envelope containing a pressure consolidate block of thermal insulation in the form of a belically and unterprove envelope containing a pressure consolidate block of thermal insulation and the proportion of opacifier is from 5 to 80% of the weight of t		in an amount up to 12% by weight.	as herein described with reference to either	5.5
3. Thermal insulation material comprising an intimate mixture of microporous silica acrogel (as herein defined), an opacifier and alumina fibres in a proportion of up to 12% by weight.  10. 4. Material as claimed in Claim 2 or Claim 3 in which the opacifier is phase-stabilized black ferrosoferric oxide, iron oxide, manganese dioxide, (litanium dioxide, chronium dioxide, zirconium dioxide, ilemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in claim 5 in which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  Silica aerogel 50–97, fibre 2-7, opacifier 25-40.  10. Material as claimed in Claim 8 in which the percentages by weight of the components being:  Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40.  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40.  11. Material as claimed in claim 10 in which the percentages by weight of the components being:  Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40.  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40.  11. Material as claimed in claim 10 in which the percentages by weight of the components are:  Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40.  11. An allocation in the form of a spoot of thermal insulating material as claimed in any of claims 1 to 12.  11. Insulation in the form of a spoot of thermal insulating material as claimed in any of claims 1 to 12.  12. A thermal insulation in the form of a smooth of the envelope being in an state of tension and the block bei				33
an intimate mixture of microporous stilica aerogel (as herein defined), an opacifier and alumina fibres in a proportion of up to 12% by weight.  4. Material as claimed in Claim 2 or Claim 3 in which the opacifier is phase-stabilized black ferrosoferic oxide, iron oxide, manganese dioxide, /titanium dioxide, chromium dioxide, zirconium dioxide, ilemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in any of claims 1 to 10% of 100% of the weight of the silica.  7. Material as claimed in any preceding claim which contains at least some alumina fibres and in which the percentages by weight of the opacifier 2-40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  silica aerogel 50-97 fibre 2-70 opacifier 2-40.  10. Material as claimed in Claim 8 in which the percentages by weight of the components being:  silica aerogel 50-97 fibre 0-5-10 opacifier 2-40.  11. Material as claimed in claim 10 in which the percentages by weight of the components being:  silica aerogel 50-97 fibre 0-5-10 opacifier 2-40.  11. Material as claimed in oli multich the percentages by weight of the components being:  silica aerogel 50-97 fibre 0-5-10 opacifier 2-40.  11. Material as claimed in oli multich the percentages by weight of the components being:  silica aerogel 50-97 fibre 0-5-10 (1). Material as claimed in any preceding claim which contains at lumina as an additional ordinate	5	a mi i i i i i i i i i i i i i i i i i i		
aerogel (as herein defined), an opacifier and alumina fibres in a proportion of up to 12% by weight.  10	٦.			
alumina fibres in a proportion of up to 12% by weight.  10				
by weight.  10			being a material as claimed in any preceding	60
in which the opacifier is phase-stabilized black ferrosoferric oxide, iron oxide, manganese dioxide, /titanium dioxide, chromium dioxide, zirconium dioxide, elemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any preceding claim which contains at least some alumina fibres and in which the percentages by weight of the components are:  8. Material as claimed in any of claims 1 to 6 which contains a least some alumina fibres and in which the percentages by weight of the components are:  9. Material as claimed in any of claims 1 to 6 which contains a least some alumina fibres and in which the percentages by weight of the components are:  10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  12. Silica aerogel 60–73, fibre 2-7, opacifier 2-40, alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  12. Silica aerogel 50–97 fibre 0.5-10 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  12. Silica aerogel 60–72 components are:  13. Silica aerogel 60–72 components are:  13. Silica aerogel 60–72 components are:  13. Silica aerogel 60–73, fibre 2-7, opacifier 2-40 components are:  13. Silica aerogel 60–73, fibre 0-7, fibre			claim.	_
in which the opacifier is phase-stabilized black ferrosoferric oxide, iron oxide, manganese dioxide,/tianium dioxide, chromium dioxide, zirconium dioxide, ilemnite rutile or carbon black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the precentages by weight of the components are:  10. Material as claimed in Claim 8 in which the precentages by weight of the components are:  10. Material as claimed in any of claims 1 to 6 which contains alumina as an additional component, the percentages by weight of the components being:  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  12. Silica aerogel 60–73, fibre 2-7, opacifier 2-40, alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  12. Silica aerogel 60–72, fibre 0.5-10, opacifier 2-40, alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  13. Silica aerogel 60–72, fibre 0.5-10, opacifier 2-40, alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  13. Silica aerogel 60–72, fibre 0.5-10, opacifier 2-40, opacif	10	4. Material as claimed in Claim 2 or Claim 3	14. Insulation in the form of a porous	
dioxide,/titanium dioxide, chromium dioxide, zirconium dioxide, terromium dioxide, terromium dioxide, terromium dioxide, chromium dioxide, zirconium dioxide, leminte rutile or carbon black.  5 Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6 Material as claimed in Claim 5 in which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7 Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8 Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  8 Material as claimed in Claim 8 in which the percentages by weight of the components are:  8 Material as claimed in Claim 8 in which the percentages by weight of the components are:  8 Silica aerogel 60—73, fibre 2-7, opacifier 2-40  10 Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  8 Silica aerogel 50—97 fibre 0.5-10 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8 Silica aerogel 60—72 fibre 2-7 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8 Silica aerogel 60—72 fibre 2-7 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8 Silica aerogel 60—72 fibre 2-7 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8 Silica aerogel 60—72 fibre 2-7 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight 0.5-10 alumina 0.5-10.  12. A unit as claimed in Claim 10 in which the percentages by weight 0.5-10 alumina 0.5-10.  13. A nelectrical leating unit for a smooth to the surface of the supportin		in which the opacifier is phase-stabilized		
zirconium dioxide, ilemnite rutile or carbon 15 black.  5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in to 80% of the weight of the silica.  7. Material as claimed in any proceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  35. Silica aerogel 50–97, fibre 1–10, opacifier 2–40, 10. Material as claimed in Claim 8 in which the percentages by weight of the components being:  35. Silica aerogel 60–73, fibre 2–7, opacifier 2–40 alumina 0.5–10.  36. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  36. Silica aerogel 50–97 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  37. Aunit as claimed in Claim 10 in which the percentages by weight of the components are:  38. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  39. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  30. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  30. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  30. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  30. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  31. Material as claimed in Claim 10 in which the percentages by weight of the components are:  32. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  33. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  34. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  34. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  35. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  36. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  37. Aunit s claimed in Claim 10 in which the percentages by w		black ferrosoferric oxide, iron oxide, manganese		
consolidate block of thermal insulating material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  25. 8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  27. Material as claimed in Claim 8 in which the percentages by weight of the components are:  28. Material as claimed in Claim 8 in which the percentages by weight of the components are:  29. Material as claimed in Claim 8 in which the percentages by weight of the components are:  20. Silica aerogel 60—73, fibre 2—7, opacifier 25—40.  21. Material as claimed in any of claims 1 to 6 which contains alumina as an additional 40 component, the percentages by weight of the components being:  21. Silica aerogel 50—97 fibre 0.5—10 opacifier 2—40 alumina 0.5—10.  22. Silica aerogel 60—72 fibre 2—7 opacifier 2—40 alumina 3 claimed in Claim 10 in which the percentages by weight of the components are:  23. Silica aerogel 60—72 fibre 2—7 opacifier 25—40.  24. Silica aerogel 50—97 fibre 0.5—10 opacifier 2—40 alumina 0.5—10.  24. Silica aerogel 50—97 fibre 0.5—10 opacifier 2—40 alumina 0.5—10.  25. Silica aerogel 60—72 fibre 2—7 opacifier 2—7				65
5. Material as claimed in any of claims 2 to 4 in which the proportion of opacifier is from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in 20 which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  5. Silica aerogel 50–97, fibre 1–10, opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  5. Silica aerogel 60–73, fibre 2–7, opacifier 25–40.  10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  5. Silica aerogel 50–97 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  5. Silica aerogel 50–97 fibre 0.5–10 opacifier 2–40 alumina 2–40 alumina 2–40 alumina 2 sclaimed in Claim 10 in which the percentages by weight of the components being:  5. Silica aerogel 60–72 fibre 0.5–10 opacifier 2–40 alumina 2 sclaimed in Claim 10 in which the percentages by weight of the components are:  5. Silica aerogel 50–97 fibre 0.5–10 opacifier 2–40 alumina 0.5–10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  5. Silica aerogel 60–72 fibre 0.5–10 copacifier 2–40 alumina 0.5–10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  5. Silica aerogel 60–72 fibre 0.5–10 copacifier 2–40 alumina 0.5–10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  5. Silica aerogel 50–97 fibre 0.5–10 copacifier 2–40 alumina 0.5–10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  5. Silica aerogel 50–97 fibre 0.5–10 copacifier 2–4				
of the envelope being in a state of tension and the block being bonded at least partly to the envelope by penetration of the particles of the block into the porce of the weight of the silica.  7. Material as claimed in any preceding claim which contains at least some alumina fibres and in which the percentages by weight of fibre 1–10, opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35. Silica aerogel 50–97, fibre 2–7, opacifier 25–40.  10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components, the percentages by weight of the components are:  36. Silica aerogel 50–97 fibre 0.5–10 opacifier 2–40.  37. Material as claimed in Claim 10 in which the percentages by weight of the components being:  38. Silica aerogel 50–97 fibre 0.5–10 opacifier 25–40.  39. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  39. Silica aerogel 60–73, fibre 2–7, opacifier 25–40.  30. Silica aerogel 60–73, fibre 2–7, opacifier 25–40.  30. Material as claimed in claim 10 in which the percentages by weight of the components are:  30. Silica aerogel 60–73, fibre 2–7, opacifier 25–40.  31. Material as claimed in claim 10 in which the percentages by weight of the components being:  32. Silica aerogel 50–97 fibre 0.5–10 opacifier 25–40.  33. Material as claimed in claim 10 in which the percentages by weight of the components are:  34. Silica aerogel 50–97 fibre 0.5–10 opacifier 25–40.  35. Silica aerogel 50–97 fibre 0.5–10 opacifier 25–40.  36. Material as claimed in any preceding claim which contains alumina as an additional components being:  37. Silica aerogel 60–73 fibre 0.5–10 fibre 0.	15			
from 2 to 100% of the weight of silica.  6. Material as claimed in Claim 5 in to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  35. Material as claimed in Claim 8 in which the percentages by weight of the components are:  36. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  36. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  37. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  38. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  39. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  39. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  30. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  39. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  30. Material as claimed in Claim 10 in which the percentages by weight of the components being:  30. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  31. Material as claimed in Claim 10 in which the percentages by weight of the components being:  32. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  33. Silica aerogel 50–97 fibre 0.5–10 oppacifier 2–40 alumina 0.5–10.  34. An electrical heating unit for a smooth top cooker hob comprising a supporting layer of the supporting layer and which pass into, but not entirely through the base layer, the material of the supporting layer on the preceding claim which contains a				
6. Material as claimed in Claim 5 in 20 which the proportion of opacifier is from 5 to 80% of the weight of the silica. 7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres. 25 8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  30 6 fibre 1-10, opacifier 2-40. 9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35 8 silica aerogel 60-73, fibre 2-7, opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  36 silica aerogel 50-97 fibre 0.5-10 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  38 silica aerogel 50-97 fibre 0.5-10.  19 Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  39 Silica aerogel 50-97 fibre 0.5-10.  10 Material as claimed in many preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  30 Silica aerogel 50-97 fibre 0.5-10.  31 Silica aerogel 50-97 fibre 0.5-10.  32 Silica aerogel 50-97 fibre 0.5-10.  33 Silica aerogel 50-97 fibre 0.5-10.  34 Silica aerogel 50-97 fibre 0.5-10.  35 Silica aerogel 50-97 fibre 0.5-10.  36 Silica aerogel 50-97 fibre 0.5-10.  37 Silica aerogel 50-97 fibre 0.5-10.  38 Silica aerogel 50-97 fibre 0.5-10.  39 Silica aerogel 50-97 fibre 0.5-10.  30 Silica aerogel 50-97 fibre 0.5-10.  30 Silica aerogel 50-97 fibre 0.5-10.  31 Silica aerogel 50-97 fibre 0.5-10.  32 Silica aerogel 50-97 fibre 0.5-10.  33 Silica aerogel 50-97 fibre 0.5-10.  34 Silica aerogel 50-97 fibre 0.5-10.  35 Silica aerogel 50-97 fibre 0.5-10.  36 Silica aerogel 50-97 fibre 0.5-10.  37 Silica aerogel 50-97 fibre 0.5-10.  38 Silica aerogel 50-97 fibre 0.5-10.  39				
which the proportion of opacifier is from 5 to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  8. Silica aerogel 50–97, fibre 1–10, opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  8. Silica aerogel 60–73, fibre 2-7, opacifier 25–40.  10. Material as claimed in any preceding claim which contains alumina as an additional components being:  8. Silica aerogel 50–97  10. Material as claimed in any preceding claim which contains alumina as an additional components being:  8. Silica aerogel 50–97  10. Material as claimed in one the components are:  8. Silica aerogel 50–97  11. Material as claimed in Claim 10 in which the percentages by weight of the components being:  8. Silica aerogel 50–97  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8. Silica aerogel 50–97  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8. Silica aerogel 50–97  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8. Silica aerogel 50–97  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  8. Silica aerogel 50–97  12. A unit as claimed in any of claims 2 to 12.  13. A nelectrical heating unit for a smooth top cooker hob comprising as upporting layer of the termila and electrical heating unit with the percentages by weight of the components are:  8. Silica aerogel 60–72  10. Material as claimed in any preceding claim which contains a lumina as an additional directly supporting an electrical heating unit with the percentages by weight of the components are:  8. Silica aerogel 60–73.  12. A unit as claimed in any of claims 2 to 12.  13. A nelectrical heating unit with the				70
to 80% of the weight of the silica.  7. Material as claimed in any preceding claim which contains from 1 to 7% by weight of alumina fibres.  25. 8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  30. fibre 1-10, opacifier 2-40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35. silica aerogel 60-73, fibre 2-7, opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  36. silica aerogel 50-97 tibre 0.5-10 opacifier 2-40 alumina 0.5-10.  37. An electrical heating unit for a smooth top cooker hob comprising a supporting layer of thermal and electrical heating unit subtantial winch condaring alumina in the form of a helically coiled bare wire and which is secured to the insulating material by metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting layer and which pass into, but not entirely through the base layer, the material of the supporting layer comprising an intimate mixture of microprova silica aerogel (as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  38. An electrical heating unit for a smooth top cooker hob comprising a supporting layer of the travel which is in the form of a helically coiled bare wire and which is secured to the insulating material by metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting and intimate mixture of microprova silica aerogel (as herein defined) and ceramic reinforcing fibres, the material of the supporting alumina in an annount up to 12% by weight.  39. An electrical heating unit substantially alignent which is in the form of a helically coiled bare wire and which is secured to the insulating material by metal wire staples which engage over par	20			
7. Material as claimed in any preceding claim which contains at least some alumina fibres and in which the percentages by weight of the components are:  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35. Silica aerogel 60–73, fibre 2-7, opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional components being:  36. An electrical heating unit for a smooth top cooker hob comprising a supporting layer of thermal and electrical insulating material directly supporting an electrical heating element which is in the form of a helically coiled bare wire and which is secured to the insulating material by metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting layer and which pass into, but not entirely through the base layer, the material of the supporting layer oprous silica aerogel (as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit for a smooth top cooker hob comprising a supporting an electrical heating unit which is secured to the insulating material by metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting layer and which pass into, but not entirely through the base layer, the material of the supporting layer or oprous silica aerogel (as herein defined) and ceramic reinforcing fibres, the mixture of microporous silica aerogel (as herein defined) and ceramic reinforcing fibres, the mixture of microporous silica aerogel (as herein defined) and ceramic	20			
claim which contains from 1 to 7% by weight of alumina fibres.  S. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  Silica aerogel 50–97, fibre 1–10, opacifier 2–40.  Silica aerogel 60–73, fibre 2–7, opacifier 25–40.  10. Material as claimed in any porting a melectrical heating as supporting layer of the mala and electrical heating as supporting an electrical heating unit for a smooth top cooker hob comprising a supporting layer of the proceder and which is in the form of a helically coiled bare wire and which is excured to the insulating material by metal wire staples which engage over parts of the wire convolutions adjacent to the surface of the supporting layer and which pass into, but not entirely through the base layer, the material of the supporting layer comprising an intimate mixture of microporous silica aerogel (as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit for a smooth top cooker hob comprising a supporting layer on the learning directly supporting an electrical heating unit substantially and electrical heating and electrical heating unit substantially and which each of the supporting an electrical heating unit substantially and which pass into, but not entirely through the base layer, the material of the supporting layer omprising an intimate mixture of microporous silica aerogel (as herein defined) and ceramic reinforcing fibres, the material of the supporting layer is a material				
of alumina fibres.  8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  silica aerogel 50–97, fibre 1–10, opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  silica aerogel 60–73, fibre 2–7, opacifier 25–40.  10. Material as claimed in any preceding claim which contains alumina as an additional components being:  silica aerogel 50–97 fibre 0.5–10 opacifier 2–40  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60–72 silica aerogel 50–97 fibre 0.5–10 opacifier 2–40  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60–72 silica aerogel 60–72 fibre 0.5–10 Opacifier 2–40  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60–72 silica aerogel 60–72 LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100  100  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 105–109 Strand, London, WC2R 0AE			16 An electrical heating unit for a smooth	~ ~
25 8. Material as claimed in any of claims 1 to 6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  30			ton cooker hob comprising a supporting layer	15
6 which contains at least some alumina fibres and in which the percentages by weight of the components are:  30 Silica aerogel 50–97, fibre 1–10, opacifier 2–40. 31 Silica aerogel 60–73, fibre 2–7, opacifier 25–40. 32 Silica aerogel 60–73, fibre 2–7, opacifier 25–40. 33 Silica aerogel 60–73, fibre 2–7, opacifier 25–40. 34 Silica aerogel 50–97	25			
and in which the percentages by weight of the components are:    Silica aerogel   50-97,   1-10,   0 pacifier   2-40.   9. Material as claimed in Claim 8 in which the percentages by weight of the components are:    Silica aerogel   60-73,   10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:    Silica aerogel   50-97   10. Material as claimed in any preceding claim which contains alumina as an additional components being:    Silica aerogel   50-97   11. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   60-72   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   60-72   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   60-72   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   60-72   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   60-72   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   50-97   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   50-97   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   50-97   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   50-97   10. Material as claimed in Claim 10 in which the percentages by weight of the components are:    Silica aerogel   50-97   10. Material as claimed in claim 10 in which the material of the supporting layer comprising an intimate mixture of micro-taining alumina in an amount up to 12% by weight.    Some part of the supporting layer comprising an intimate mixture of micro-taining alumina in an amou	20			
components are:     silica aerogel 50–97,     fibre 1–10,         opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35     silica aerogel 60–73,         fibre 2–7,				
silica aerogel 50–97, fibre 1–10, opacifier 2–40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35			coiled bare wire and which is secured to the	80
opacifier 2-40.  9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35			insulating material by metal wire staples which	00
9. Material as claimed in Claim 8 in which the percentages by weight of the components are:  35	30			
the percentages by weight of the components are:  35		1		
are:    Silica aerogel 60-73, fibre 27, opacifier 25-40.   10. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:    Silica aerogel 50-97				
silica aerogel 60-73, fibre 2-7, opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  silica aerogel 50-97 fibre 0.5-10 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60-72 fibre 2-7 opacifier 2-40  10. Material as claimed in any preceding claim which contains alumina as an additional the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein defined) and ceramic reinforcing fibres, the mixture containing alumina in an amount up to 12% by weight.  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  19. Chartered Patent Agents, Norman House, 100 105-109 Strand, London, WC2R 0AE				85
fibre 2-7, opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  Silica aerogel 50-97	35	<del></del>		
opacifier 25-40.  10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  19. LLOYD WISE, BOULY & HAIG Chartered Patent Agents, are:  100. Silica aerogel 60-72	33			
10. Material as claimed in any preceding claim which contains alumina as an additional component, the percentages by weight of the components being:    Silica aerogel 50-97				
claim which contains alumina as an additional 40 component, the percentages by weight of the components being:  silica aerogel 50-97 fibre 0.5-10 opacifier 2-40 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60-72 fibre 2-7 opacifier 25-40  17. A unit as claimed in Claim 16 in which the material of the supporting layer is a material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100 105-109 Strand, London, WC2R 0AE				90
components being:  silica aerogel 50-97 fibre 0.5-10 opacifier 2-40  11. Material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, are:  Silica aerogel 60-72 fibre 2-7 opacifier 25-40  material as claimed in any of claims 2 to 12.  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100 105-109 Strand, London, WC2R 0AE			17. A unit as claimed in Claim 16 in which	90
silica aerogel 50-97 fibre 0.5-10 opacifier 2-40  45 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  silica aerogel 60-72 fibre 2-7 opacifier 25-40  18. An electrical heating unit substantially as herein described with reference to the accompanying drawing.  50 LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100 105-109 Strand, London, WC2R 0AE	40		the material of the supporting layer is a	
fibre 0.5-10 as herein described with reference to the accompanying drawing.  45 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  Silica aerogel 60-72 105-109 Strand, fibre 2-7 London, WC2R 0AE 09acifier 25-40		components being:		
opacifier 2-40 companying drawing.  45 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  Silica aerogel 60-72 l05-109 Strand, fibre 2-7 London, WC2R 0AE opacifier 25-40			18. An electrical heating unit substantially	
45 alumina 0.5-10.  11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  Silica aerogel 60-72  fibre 2-7  opacifier 25-40  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100  105-109 Strand, London, WC2R 0AE				95
11. Material as claimed in Claim 10 in which the percentages by weight of the components are:  Silica aerogel 60-72  fibre 2-7  opacifier 25-40  LLOYD WISE, BOULY & HAIG Chartered Patent Agents, Norman House, 100  105-109 Strand, London, WC2R 0AE		<b>.</b>	companying drawing.	
the percentages by weight of the components are:  Silica aerogel 60-72 Silica aerogel 60-72 Silica aerogel 60-72 So fibre 2-7 So opacifier 25-40  Chartered Patent Agents, Norman House, 100 London, WC2R 0AE	45		LLOVE WHEE BOARD A THIC	
are:    Silica aerogel   60-72   105-109 Strand,				
silica aerogel 60-72 105-109 Strand, 50 fibre 2-7 London, WC2R 0AE opacifier 25-40				
50 fibre 2-7 London, WC2R 0AE opacifier 25-40			,	100
opacifier 2540	SO			
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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale



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